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# The Chronicle

of the Early American Industries Association, Inc.

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## ENGLISH PLOWS OF THE 18th CENTURY

The Editors of *The Chronicle* were recently perusing the bound copies of old issues. We were impressed by the fact that with the exception of a small article by Dr. Dixon Ryan Fox of Union College, entitled *Early American Farms*, (*The Chronicle* for February, 1940), there is practically no information published in our magazine in regard to the development of that most basic of all implements, the plough. We feel that this is a serious omission in our published literature and one which should be corrected. We further feel that there must be members of the Association who are well acquainted with various aspects of the development of the plough from its earliest forms used in America to the present day.

In order to stimulate a discussion of this subject we thought it would be well to start at the beginning, which we believed would be a study of ploughs available to the American farmer, through his English heritage, during the eighteenth century. We have many times noted, in the case of other tools, the American genius for improving the implements handed down by English forebears. A good example of this is given in Henry Kauffman's article in the last issue on the development of the American axe. It would appear to us to be probable that much the same sort of thing must have happened to the plough. We are aware that the "Sage of Monticello," Thomas Jefferson, is credited with the first recorded development of the mould-board plough which actually turns the soil, but we believe there must be more to the story than that. Thomas Mann Randolph, Jefferson's son-in-law, is credited with leading the movement for cross-ploughing slopes, and the development of the so-called "hillside plough." Then too, we have heard that the New York Quaker, Jethro Wood, in 1819, produced the first plough of standard iron parts bolted together, but we believe that all of these facts are mere scattered bits of information and should be comprehensively studied and tied together by some of the experts in the *Early American Industries Association*. We would like to reiterate that we merely consider this rather extensive article an introduction to the subject and we sincerely hope that it will stimulate some further discussion and articles from our members.

This article is extracted from the *Cyclopedia, or an Universal Dictionary of Arts and Sciences, containing an explanation of the terms and an account of the several subjects in the Liberal and Mechanical Arts, and the Sciences, Human and Divine, intended as a course of ancient and modern learning*. This monumental work first appeared in the year 1728 in two volumes. It was written by Ephraim Chambers, F. R. S., a

London mapmaker, traveler, and translator. A second and third edition appeared in 1738 and 39 respectively, and Mr. Chambers died in 1740. After his death two more editions appeared in 1741 and 1745. Some of Chambers' works having been translated into French are said to have inspired the greatest of all craft encyclopedias, the *Dictionary Des Arts and Des Sciences* of Diderot and D'Alembert. The Chambers Cyclopedia was re-edited, enlarged and improved upon by Abraham Rees (1743-1820), a former tutor at Huxton and a pastor in the Old Jewry congregation. The Rees' edition of Chambers appeared between 1778 and 1791. It is from this edition that our information is taken. Between 1802 and 1820 Rees worked on and finally published his own colossal *New Cyclopedia* of 45 volumes. Despite the excellence of Chambers' encyclopedia, its greatest shortcoming is its lack of illustrations. Only a few such excellent illustrations as the one shown here on ploughs are available.

"**PLOUGH**, or Plow, in *Agriculture*, a popular machine for the breaking up of ground; consisting of a train or carriage with two large irons, the one pointed, the other edged; serving to cut and open the land, and draw furrows therein. The parts of the *Plough* are, the *plough-beam*, the *handle*, *tail*, *stilt*, *hales* or *staves*, *neck* or *share-beam*, *earth-board*, *mould-board*, *breast-board*, *furrow-board*, *shield-board*, etc. the *sheath*, *share-iron*, *coulter*, *plough-pin*, and *collar-links*, *plough pillar*, and *bolster*, and sometimes *wheels*.

The advantage of digging with the spade, or such other instrument, very naturally led men to the invention of the *plough*, as a much more expeditious way of doing the same thing; that is, cutting and breaking the earth into small pieces; but in this the spade has the advantage of the common *plough*, as it goes deeper, and divides the earth more minutely; but the improvement of the common *plough* into the four-coultured one shews, that it is easy to make the *plough* perform this office as much better, as it usually does it worse than the spade. The *plough* described by Virgil had not coulter; and at this time the *ploughs* in Italy and the south of France, have none; and the *ploughs* in Greece, and in the eastern nations in general, are of the same kind. Neither is it indeed possible to use a coulter in such a *plough*; because the share does not cut the bottom of the furrow horizontally, but obliquely: in going one way it turns off the furrow to the right hand, but in coming back it turns it off to the left; therefore, if it had a coulter, it must be on the wrong side every other furrow.

It is a great mistake in those who say that Virgil's *plough* had two earth-boards, for it had really none at all; but the

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share itself always going obliquely, served instead of an earth-board; and the two ears, which were the corners of a piece of wood lying under the shares, did the office of ground-wrists. This fashion of the *plough* continues to this day in those countries; and in Languedoc this sort of *plough* performs tolerably well when the ground is fine, and make a shift to break up light land. This is the sort of land that is common in the East; and the arable lands about Rome being never suffered to be fallow so long as to come to turf: this *plough* succeeds very well in such places, but it would be wholly impossible to turn up what in England we call strong land with it.

The English *ploughs* are therefore different from these, as the soil is different. Our *ploughs*, where well made, cut off the furrow at the bottom horizontally; and therefore, it being as thick on the land side as on the furrow side, the *ploughs* cannot break it off from the whole land at such a thickness (being six times greater than what the eastern *ploughs* have to break off), and for this purpose it must have, of necessity, a coulter to cut it off: by this means the furrow is turned perfectly whole, and no part of the turf of it is broken; and if it lie long without new turning, the grass from the edges will spread, and form a new turf on the other side, which was the bottom of the furrow before the turning, but is now become the surface of the earth, and will soon become greener with grass than it was before *ploughing*.

If whole, strong, turfy furrows are *ploughed* cross-ways, as is too commonly practised, the coulter cannot easily cut them; because, being loose underneath, they do not make a proper resistance or pressure against its edge, but are apt to be drawn on heaps, and turned in all directions, but without cutting.

Some of our *ploughs* have heavy drags, with long iron tines in them; and though these broken pieces of furrows, being now looser than before, require keener edges to cut them, these tines have no edges at all. Thus the clods of earth are tossed into heaps again, and the surface left bare between them, and great labour and expense are used to very little purpose; all this is owing to the one coulter.

If the soil be shallow, it may be broken up with a narrow furrow, which will the sooner be brought into tilth; but if it be a deep soil, the furrows must be proportionably enlarged, or else a great part of the good mould will be left unmoved, and so be lost. The deeper the land is, the worse it is broke by one coulter; that is, it is broke into larger furrows, and it requires such repeated labour to conquer this, that often the best land will scarce pay the tillage.

This gives an opportunity to servants to cheat their masters. They *plough* such deep land with a small furrow, and shallow, to the end that the turf and furrows may be broken the sooner, and the superficial part made fine. They pretend the *plough* will go deeper the next time; but this is never the case.

This sort of land must not be *ploughed* the second time in wet weather; for this will cause the weeds to multiply, and the earth will be formed into thick and heavy clods where trodden: and in dry weather the resistance of the untouched earth below, and the slight pressure of the *plough* above, will always be reasons why the *plough* will enter no deeper the second time than it did the first.

Another way to conquer a strong turf, is to plough it up first with a breast-*plough*, very thin; and when the sward is

rotten, then it is to be *ploughed* to the proper depth: but this method is liable to great objections; it is very troublesome and expensive, and if the turf be pared off in the winter, or early in the spring, it is a chance but the rains come on, and set it to growing faster than before: if, on the other hand, it be pared later in the year, though the turf be thoroughly killed by the succeeding dry weather, yet the time is lost, and the farmer loses the sowing season for wheat, which is the proper corn for such strong land.

The contrivance and structure of *ploughs* are various, according to the fancy of the maker, or the soil and uses to which they are applied; so that it would be endless to give a particular description of all: but that this work may not be thought essentially defective in this particular, we shall here subjoin a brief account of several kinds of *ploughs* that have fallen under our notice, and that have been recommended by the advantages attending their structure.

The common *dray* or *drag* Plough is well known: this is made without either wheel or foot, of an easy draught, and best in winter for miry clays, where the land is soft: but in summer and especially in hard soil it is inconvenient, because its point will be continually rising out of the ground.

In the *double* Plough, one *plough* is fixed to the side of another, so that by means of four horses and two men, a double furrow is *ploughed* one by the side of the other. There is another kind of *double plough* whereby two furrows are *ploughed* at once, one under another, by which the earth is stirred up to the depth of twelve or fourteen inches, which in many cases is of great benefit.

This purpose is well answered by the *double* Plough invented by Mr. Randal, (1) (See fig. 7.) which, by putting the share point to the middle of the interval left by the horse-hoe, throws the mould on each side of it, at the same time, towards the rows, and earths them up to what degree the ploughman pleases: and also by the *double lifting* Plough, (fig. 8.) which passes into all the trenches made by the *double plough* and by means of the irons, running up on each side of the *plough*, will lift up the mould, and throw it upon the old ridges; so that the ground, thus *ploughed*, will lie in deep trenches and high ridges.

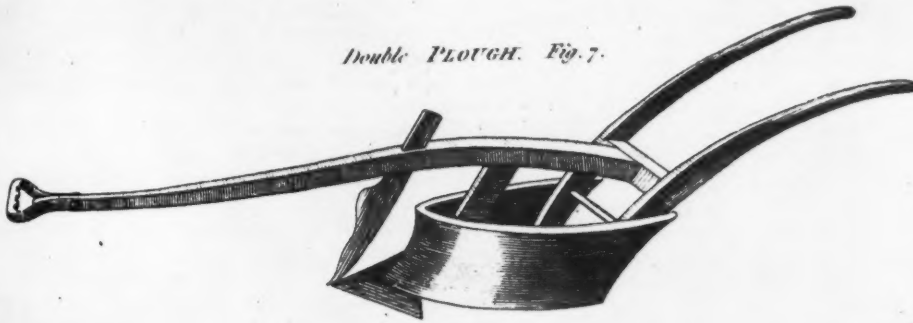
The *double wheeled* Plough has of late years become universally used in many countries, and is found much preferable to the *ploughs* they used before; there is an objection to it indeed, in regard to some stiff and miry lands, in which the wheels become clogged up, and cannot turn. This, however, is easily remedied by twisting thumb ropes of straw about the iron circle and spokes of the wheels; these spreading as they turn, and as the circle twist bears upon the ground, throw off the dirt, and never clog. The two principal parts of this *plough* are the head and the tail: the *plough-head* contains the two wheels, A, B. (fig. 9.) and their axis, or spindle of iron, passing through the box C, and turning round both in it and in the wheels. There are fixed perpendicularly in this box, two crow-staves D, D, which are flat and narrow boards, each having in it two rows of holes, whereby to raise or sink the beam of the *plough*, by pinning up or down the pillow E, to increase or diminish the depth of the furrow. Behind are the gallows F, through which the crow-staves pass at the top by mortises, into which they are pinned; and to these are fastened what are called the wilds, G, with links and crooks of iron, by which the whole *plough* is drawn in the working. From the box to the centre of the beam there is

carried an iron-chain, consisting of four, five, or more long links, and called the tow-chain, H: this fastens the plough-tail to the plough-head. It is fixed to an iron collar, I, fastened in the beam at one end, and the other passes through a hole in the middle of the box, and is pinned in by the stake K. From the same iron-collar to which the tow-chain is fixed, there is another chain fastened, called the bridle-chain L: this runs above the beam, as the tow-chain does below it, and is composed of smaller and more numerous links. At the up-end, as the tow-chain enters the box of the plough, this bridle-chain is fixed to the top of what is called the stake of the plough; this is a perpendicular stick, carried up parallel with the left crow-staff, and pretty near it, and fastened to it by a wyth of rope M, or by the end of the bridle-chain itself, when that is long enough. This stake is also fastened in its lower part, under the gallows, to the same crow-staff, by another wyth or piece of rope.

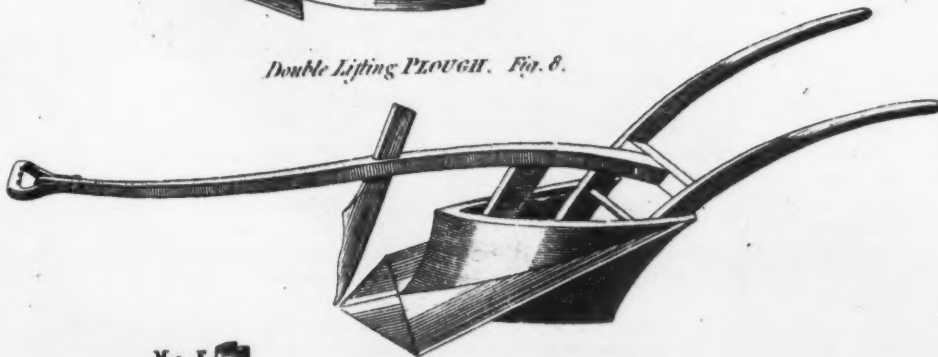
These are the parts of which the head-part of the beam, N, carried from the head to the very extremity, and serving as the support and base of all the rest. A little below the collar, to which the tow-chain and bridle-

chain are fastened, this beam is pierced with a large hole, which lets through the coulter, O: this is a long and narrow piece, terminating in an edge, and reaching just to the share, P; and it is fixed immoveable in its place by means of a wedge which is driven into the hole of the beam with it: the office of this coulter is to cut the earth as it is thrown up by the share. Behind these, the same beam is pierced with two more holes, one very near its end: these give passages to two oblong pieces, called the fore-sheat Q and hinder-sheat R, by which the plough-share is supported in its place. To the top of the hinder-sheat there is fastened a short handle, S, by a wooden pin. Parallel to the hinder-sheat there runs up a piece of wood of much the same form, called the drock, T; and to this is fastened another horizontal piece, called the ground-wrist, V: these are all on the right hand side of the plough, and parallel with the fore-sheat. There runs another piece, of much the same form with it, on the right hand; and the bottom of this is the earth-board, whose fore-part, W is seen before the sheat. The long handle, X, of this whose fore-part appears before the sheat, which reaches as far as that of the sheat, is fastened to the drock by a pin at a, the other

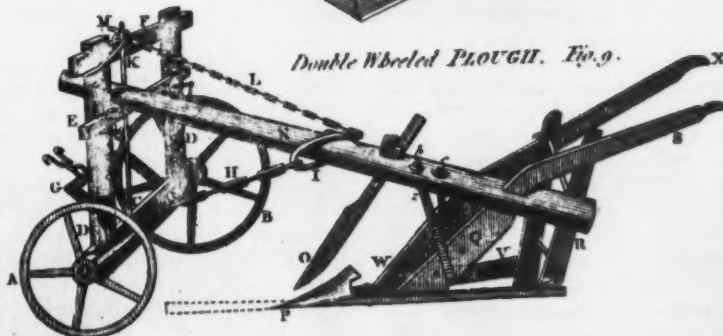
*Double PLOUGH. Fig. 7.*



*Double Lifting PLOUGH. Fig. 8.*



*Double Wheeled PLOUGH. Fig. 9.*



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end of which goes into the beam. Near the lower end of the fore-sheat, there are two flat pieces of iron, called the double reth, *z*, which pass from the two sides of it up to the beam; and, being let through it, are fastened to the upper part by screws and nuts at *b* and *c*. These keep the sheat in its place.

Plough, *draining*, or *trenching*, is an instrument used to cut out the trenches, drains, and carriages in meadow and pasture-ground. It is also used for cutting the sides of turf even, which are to be laid down again either in the same, or in some other places.

It consists of a long handle, with a knob or button at the end, and at the other end it turns upward like the foot of a *plough*, to slide in the ground. In this part is placed a coulter, of the length proportioned to the depth to be cut, and with a sharp edge; this has two wheels to make it run easy, and does a great deal of business in a very little time.

The *trenching-plough* used about Caxton, in Cambridgeshire, is larger than ordinary, and has two coulters, one before the other, which, bending inwards, cut each side of the trench. The mould-board is longer than common, in order to cast the turf a great way off from the trench. It cuts a trench a foot wide at bottom, a foot and a half at top, and a foot deep, and is drawn with twenty horses. The importance of draining wet land induced the Society of Arts, (2) &c. to propose a premium of fifty guineas for the best *plough* or machine, of the simplest construction, that should, with the least force, cut a new drain or trench one foot in perpendicular depth, one foot eight inches wide at top, and ten inches at the bottom, sloping equally on each side, the contents of which were also to be thrown equally on each side.

This premium was adjudged to Mr. Cuthbert Clark, (3) who invented the *double mould-board drain-plough*, represented *Tab. II. Agriculture, fig. 10.* which answered exceeding well in meadow ground, but could not be drawn in a stiff clay with the force of eight horses.

A, B, and C are the three coulters; D, E, F, the nuts and screws that fasten the coulters to the beams; G, H, I a wheel or roller, which prevents the *plough* from sinking too deep into the earth; this roller is divided into three parts by circular pieces of iron, which project beyond it, and cut the turf into three parts; the coulters follow in the same track, and finish that part of the work. K, K, are the centres on which the roller turns; L, L, the nuts and screws which fasten the iron arbor in which the pivots of the roller turn to the beams; the arbors are kept in their places by means of two iron braces *f, f*: M is a large iron hook, to which the tow-chain, N, by which the *plough* is drawn, is fastened: O is the head of the *plough* into which the beams are mortised; P, Q, R are the three beams; S is a shoe of iron, the whole part from S to A being of that metal, and into which the hoof of the *plough* is inserted; T is a shelf on which the mould rises after it is cut by the coulter and fore-part of the share, till it is thrown out of the trench by the mould-boards V, V: W, W is a band of iron, which fastens the hinder part of the *plough* to the main or middle beam; X is the head of a tendon, which fastens the mould-boards and hoof of the *plough* to the main-beam; Z, Z are the two handles, like those of a common *plough*, kept secure, and in their proper position by the board *a b*; *c, d*, represent the surface of the ground when the *plough* is at work; so that all the parts below that dotted line are under the ground when the drain is cutting: *f e g* is the angle which the coulters make with a line drawn parallel

to the horizontal plane, and is nearly equal to  $45^{\circ}$ : though by being so large, the *plough* tends too much to get into the earth; and, therefore, when the soil is stiff and a great force is required to draw the *plough*, it cannot be properly held by the handles, even by the force of six men, without turning over. This inconvenience might be removed by diminishing the angle *f e g* to about  $33^{\circ}$ . Mr. Clarke constructed another improved *plough* of this kind, but the premium of the society was assigned to Mr. Knowles, (4) whose *plough* cut a trench of one foot one inch in depth, twenty inches broad at top, and ten at bottom, laying the earth and turf on each side of the trench in the most exact manner.

Mr. Clarke's *single mould-board drain-plough* is represented *fig. 11.* Its construction is very similar to that already described: A is the regulating wheel, which, by the radius F, may be so adjusted as to adapt the *plough* for cuts of various depths. H, H are two coulters fastened to the wings of the share, and screwed into the bar G; they are so extended as to make the designed breadth at top, and equally sloping on each side. In whatever way the cut is made, the contents are forced up the inclined plane C, which is supported by the heel D, as in the other *plough*; and the mould-board B turns the furrow clear of the drain. This *plough* requires only four horses.

Plough, *drill*, is an instrument contrived for sowing corn in drills or rows, according to the method of the new husbandry.

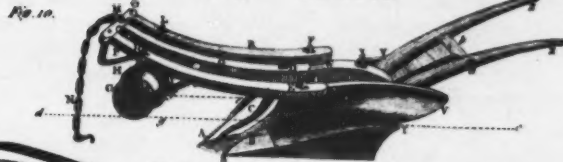
The first inventions of this kind were the *drill-plough* of Mr. Worlidge, (5) and the sembrador of Lucatello; (6) but neither of these or any other of the kind answered in practice, till Mr. Tull (7) contrived his *drill-plough*; furnished with shares, hoppers, and a harrow, so disposed, that the furrows are formed, the seed dropped into them, and covered at the same time. This curious machine is, from its nature and extensive use, so complicated, that it would lead us beyond our proper limits to give such a minute description of it, as would be sufficient to afford our readers an adequate and just idea of it. Such a description illustrated by various figures, together with the inventor's latest improvements, may be found in his *Horse-hoeing Husbandry*, chap. 21, 22, and Appendix.

Mr. Clarke, whose name has been already mentioned, has invented a *drill-plough*, (see *fig. 12.*) H are a pair of shafts; L L is a bar, which strengthens the hinges of the shafts; E, E, E are three mortises to receive the three coulters; A represents the shape of the coulter, the bulb at the end of which makes the groove or furrow for the seeds; B, B, B are oval holes to receive the piece N, which conveys the seeds down to the furrows made by the coulters; *a, a, a*, are three shes or damsels, like those of a corn mill, to receive the seeds from the three hoppers R, R, R, which are placed about eight or nine inches above the board, containing the holes B, B, B, but parallel to it, and supported by seven pillars, such as *q*. The hoppers and their shes being thus suspended, and the shes pinned to a flat bar as represented by B, B, B, and held to their station by an easy spring, they are jogged by the call or square piece of wood fixed upon the spindle, passing through the trundle O: this trundle is turned by the cog wheel H, which is turned by the axle-tree ZZ of the two wheels G G: *g* is the bridge for supporting the spindle and trundle. When the seed, jogged by the call, is made to trickle out, a person takes hold of the handles P P, and directs the



## AGRICULTURE *Tab. II.*

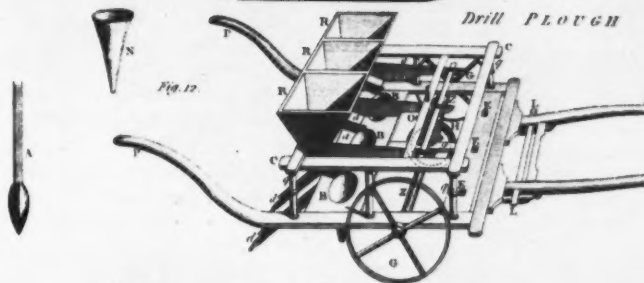
*Drain PLOUGH*



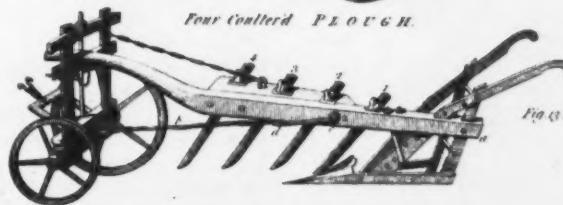
*Single mould-board PLOUGH. Fig. 11.*



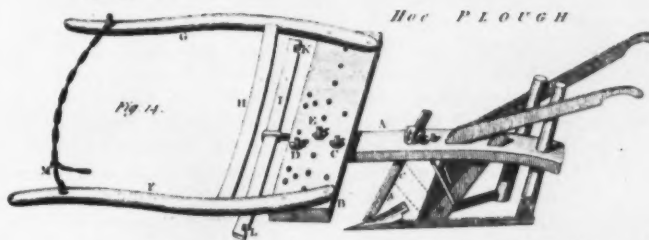
*Drill PLOUGH*



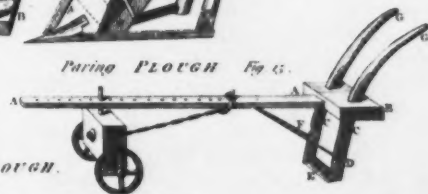
*Four Coltered PLOUGH*



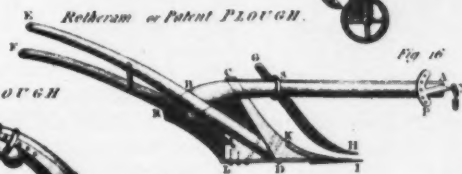
*Hoe PLOUGH*



*Paring PLOUGH Fig. 15.*



*Rotherham or Patent PLOUGH.*



*Spanish PLOUGH*



*Drill RAKE*



*J. E. R. D. S. Co.*

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whole machine, so that the seeds will be covered in by the harles *d, d, d*; which turn upon a pin or hinge at the fore end, and are loaded at the hind end with lead or any other heavy substance, as represented by the balls over *d, d, d*, to make the feet sink in the soil. This instrument may be made to shift its drills at pleasure, or to drill always at one distance.

The *four-coultered Plough* of Mr. Tull, (see fig. 13.) is different in some respects from the *double-wheeled plough* already described, though in general founded upon it. Its beam is ten feet four inches long, whereas that of the common *plough* is but eight. The beam is straight in the common *plough*, but in this it is straight only from *a* to *b*, and thence arched: so that the line let down perpendicularly from the corner at *a*, to the even surface on which the *plough* stands, would be  $11\frac{1}{2}$  inches; and if another line were let down from the turning of the beam at *b* to the same surface, it would be one foot eight inches and a half; and a third line let down to the surface from the bottom of the beam at that part which bears upon the pillow, will shew the beam to be two feet ten inches high in that part. At the distance of three feet two inches from the end of the beam *a*, at the *plough*-tail, the first coulter, or that next the share, is let through; and at thirteen inches from this, a second coulter is let through: a third at the same distance from that and, finally, the fourth at the same distance from the third, that is, thirteen inches: and from *a* to *b* is seven feet.

The crookedness of the upper part of the beam of this *plough* is contrived to avoid the too great length of the three foremost coulters, which would be too much, if the beam was straight all the way; and they would be apt to bend and be displaced, unless they were very heavy and clumsy. Ash is the best wood to make the beam of, it being sufficiently strong, and yet light.

The sheat in this *plough* is to be seven inches broad. The fixing of the share in this, as well as in the common *plough*, is the nicest part, and requires the utmost art of the maker; for the well-going of the *plough* wholly depends upon the placing this. Supposing the axis of the beam, and the left side of the share, to be both horizontal, they must never be set parallel to each other; for if they are, the tail of the share bearing against the trench as much as the point, would cause the point to incline to the right hand, and it would be carried out of the ground into the furrow. If the point of the share should be set so, that its side should make an angle on the right side of the axis of the beam, this inconvenience would be much greater; and if its point should incline much to the left, and make too large an angle on that side with the axis of the beam, the *plough* would run quite to the left hand; and if the holder, to prevent its running quite out of the ground, turns the upper part of his *plough* towards the left hand, the pin of the share will rise up, and cut the furrow diagonally, leaving it half *unploughed*. To avoid this and several other inconveniences, the straight side of the share must make an angle upon the left side of the beam; but that must be so very acute a one, that the tail of the share may only press less against the side of the trench than the point does.

This angle is shewn by the pricked lines at the bottom of fig. 9, where *ef* is supposed to be the axis of the beam let down to the surface, and *gf* parallel to the left side of the share: and it is the subtense *eg* that determines the inclination which the point of the share must have towards the left

hand. This subtense, says Mr. Tull, at the fore-end of an eight feet beam, should never be more than one inch and a half, and whether the beam be long or short, the substance must be the same. The great thing to be taken care of, is the placing the four coulters; which must be so set, that the four imaginary places described by their four edges, as the *plough* moves forward, may be all parallel to each other, or very nearly so; for if any one of them should be very much inclined to, or should recede much from either of the other, then they would not enter the ground together. In order to place them thus, the beam must be carefully pierced in a proper manner. The second coulter-hole must be two inches and a half more on the right hand than the first, the third must be as much more to the right of the second, and the fourth the same measure to the right hand of the third; and this two inches and a half must be carefully measured from the centre of one hole to the centre of the other. Each of these holes is a mortise of an inch and quarter wide, and is three inches and a half long at the top, and three inches at the bottom. The two opposite sides of this hole are parallel to the top and bottom, but the back is oblique, and determines the obliquity of the standing of the coulter, which is wedged tight up to the poll.

The Coulter is two feet eight inches long, before it is worn; the handle takes up sixteen inches of this length and is allowed thus long, that the coulter may be driven down as a point wears away.

As to the wheels, the left hand wheel is twenty inches diameter, and that on the right hand two feet three inches, and the distance at which they are set from each other is two feet  $5\frac{1}{2}$  inches.

*Plough, hoe*, an instrument adapted to the new Husbandry, and to the operation of Hoeing, for destroying weeds, keeping plants clean, and stirring the ground.

The *hoe-plough* invented by Mr. Tull is represented in fig. 14. *A* is the beam and *plough*-tail; being much the same with that of the common *plough*, fig. 9. The share from its tail to the fore-part of its socket is two feet one inch long, and from thence to the end of the point ten  $\frac{1}{2}$  inches. *B* is the plank, two feet seven  $\frac{1}{2}$  inches long, two  $\frac{1}{2}$  inches thick, and nine inches broad. *C, D* are the nuts of the two screw-pins, which hold up the beam to the plank: *E* is the nut of the draw-pin, which pin has a crook underneath, to which one of the links of the short chain of the whipper is fastened, for drawing the *plough*; *F, G* are the two limbers, screwed on to the plank by four screws and nuts, and having their inferior surface parallel to the plank, and to the upper surface of the fore-end of the beam; these limbers bend outwards from each other all the way, till they come within about a foot of the chain; and the distance of their fore-ends is two feet eight inches: they are to be made strong and stiff, and of such length, that there may be room for the horse before the bar, *H*, which holds them at their proper distance: *I* is the whipper; *K, L* are its notches, to which the traces, both of the thiller and of the horse next before him, are fastened.

This *plough* is made to go deeper or shallower by the chain of the limbers. In hoeing near the young plants, the first or second time, the earth is prevented from running over to the left side of the *plough*, and burying them, by nailing a very thin square piece of board to the sheat with one corner bearing at or below *a*, and its other lower corner bearing on the back of the coulter on its left side at *b*, its upper corner

reaching to *c* or higher: its fore-end is tied on to the coulter by a leathern thong passing through a hole very near the end of the board. The lower edge of the board must come no lower than the pricked line *a b*; which at *b*, is just even with the surface of the ground, before it is raised by the share.

Plough, *paring*, is an instrument used in several parts of England, for paring off the surface of the ground, in order to its being burnt.

Mr. Bradley (8) has given the following description of a very simple instrument of this kind: from A to A (fig. 15.) is the *plough-beam*, about seven feet long, mortised and pinioned into the block B, which is of clean timber without knots. C, C are the sheaths or standards, made flat on the inside, to close equally with the paring plate, and fastened to it with a bolt and key on each side, as at D. E is the paring plate of iron laid with steel, about four inches wide, and from twelve to eighteen inches long. This plate must be made to cut on the sides, which are bolted to the standards, as well as at the bottom part. F, F are two iron braces, to keep the standards from giving way: these standards must be mortised near their outsides, and through the block. G, G are the *plough handles*, which must be fixed slope-ways between the beam and the standards. The pin-holes in the beam, the use of which is to make this *plough* cut more or less deep, by fixing the wheels nearer to or farther from the paring plate, should not be above two inches asunder.

Plough, *Rotheram*, or *patent*, is a *plough* of very simple construction, and easily worked. The left or land side of this *plough* is represented fig. 16. A B is the beam, C D the sheath, E B D the main handle, F R the smaller handle, G H the coulter, K I the sock or share, N P the bridle, S the fly-band, and M L a piece of wood in place of a head. The whole of this *plough* should be made of ash or elm; the irons should be steeled and well-tempered; and that part of the *plough* which is under ground in tilling, should be covered with plates of iron. The difference between this and the common *plough* seems to consist in the bridle at the end of the beam, by which the *plough*-man can give the *plough* more or less land by notches at N, or make it cut deeper or shallower by the holes at P; in the coulter or share, which are so made and set as to cut off the new furrow without a tearing; and in the mould-board, which is so shaped at first to raise a little, and then gradually turn over the new cut furrow with very little resistance. But the greatest advantage attending it is its being so easy of draught, that it will do double the work of any common *plough*. Mr. Clark has also constructed a *plough*, which he says, may be worked with the least force possible.

Plough, *the single-wheel*, is lighter than most other wheel-ploughs, and may be used almost in any kind of ground; though in Sussex they have a *plough* of this kind, wide in the breech, and of heavy draught.

Plough, *Spanish*, varies much in its make from our common *ploughs*. It is a kind of semicircle pitched on one end, with the convex side turned to the *plough*-man; and the concave side (a little inclined) to the horse. Its tail is in a right line with the share. With this *plough* and one horse the Spaniards plough two or three acres of their light ground in a day. See fig. 17.

(Footnotes on Page 35)

## WHAT IS IT?



Miss Catherine C. Maull, Curator of the Zwaanendael Museum, Lewes, Delaware, has forwarded pictures of the above unidentified object for your consideration. Miss Maull suggests that the object may be a molded iron thread-holder for use on a table to hold two different size spools of thread. The large acorn is 3" long,  $1\frac{3}{4}$ " in diameter at the head, and  $1\frac{1}{2}$ " diameter at the foot. The small acorn is  $2\frac{3}{8}$ " long,  $1\frac{1}{2}$ " in diameter at the head, and  $1\frac{1}{4}$ " diameter at the foot. There is a  $\frac{1}{8}$ " hole on the underside of each utensil located just below the heads of each acorn possibly for the thread to be pulled through.

If this is a thread holder the next question would seem to be: Why is the hole on the underside? A hole on top would seem to be more logical.

It has also been suggested that this is a mold for some sort of cake or pudding although this would seem to be unlikely since the inside seems perfectly plain and without any of the ornamental details seen on the outside.

## PEWTER SPOON MOLDS

BY HENRY J. KAUFFMAN

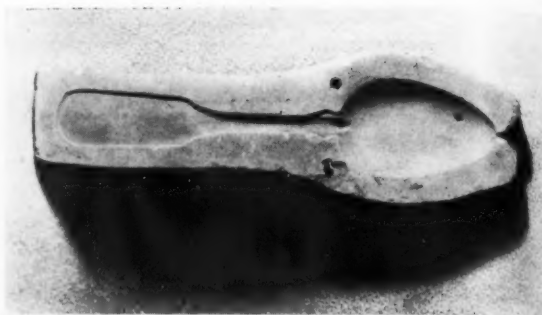
A decade ago the supply of molds for making pewter spoons seemed almost inexhaustible, but today this primitive and simple tool of our ancestors rarely appears.

The presence of a few pewter spoons bearing the marks of English or American pewterers would definitely indicate that some, if not most, of them owned molds. It would seem reasonable that many of the craftsmen carried as complete a stock of objects as possible and the demand for spoons would certainly warrant their inclusion. One might imagine that in the bigger shops the making of spoons might have been assigned to the apprentices. These embryonic craftsmen would thus get their initial experiences in the pouring of molten metal into a mold. They would certainly learn to cover the mold so that the molten pewter would not adhere to it and gain much useful experience in controlling the temperature of the metal and the mold. They could file the rough edges and polish them to a fine lustre so that they could be displayed with the important tankards or teapots that were made by the master-craftsmen.

It is also likely that itinerant craftsmen carried a mold with them to recast broken spoons or other discarded objects of pewter. A spoon did not require a lathe for finishing, as many objects did, and after the spoons were cast the itinerant could quickly rub them with a cork and pumice or pass the chore on to one of the local youths who showed promise as a handcraftsman. The life of a pewter spoon in daily use could not have been very long and there should have been a brisk business for them in the late eighteenth and early nineteenth centuries.

There were also occasions when molds were owned by a particular family. This might be true in the plantation life of the south where the demand for spoons would be great. It might also be true that a mechanically minded father might assume the responsibility for making spoons for his family, or he might want a design or pattern that was not easily obtained so he would produce them as he wanted them. Many molds have designs or letters crudely cut into them, which would seem to indicate that they were owned and used by men who had not been apprenticed to the trade.

The molds were usually made of bronze or brass, however, a mold of cast iron is not uncommon. The ones illustrated here of terra cotta and soapstone are quite rare.



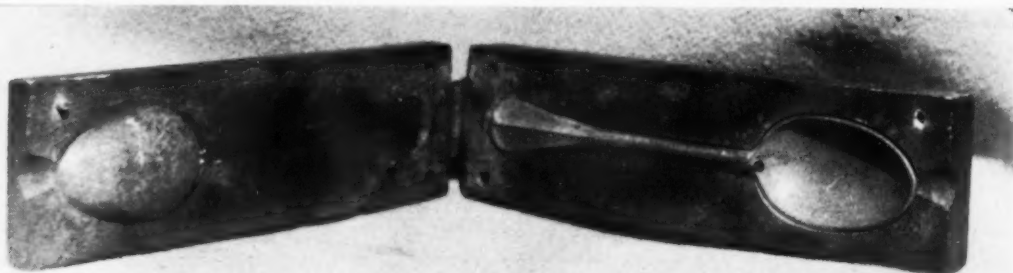
*Late mold for making pewter spoons. Such ceramic molds certainly could not be used long and few, if any other, have survived.*

*Collection of Henry J. Kauffman*



*Fine early mold of brass or bronze. The engraved designs on the inside of the mold are unique.*

*Courtesy of Old Sturbridge Village*



*Pewter spoon mold made of soapstone. This is a fine example of craftsmanship in the media. Other soapstone molds for making objects of pewter are known but they are not common.*

*Courtesy Franklin Pierce Homestead, Hillsboro, New Hampshire*



# WARP PIONEER VILLAGE



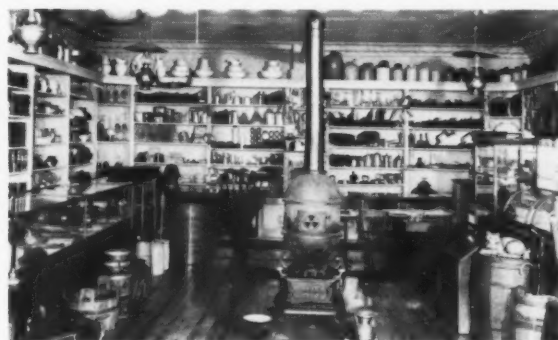
*Aerial View. 12 Buildings on 2 City Blocks. Located on U. S. Highway 6, 132 miles west of Lincoln, Nebraska.*



*Kitchen of 1830. One of 5 period kitchens in the village. Note the amusing but essential bed warmer.*



*View in Agriculture Building. This display shows the evolution of the plough from pioneer to modern times.*



*Among the many buildings on the grounds is the old General Store with shelves piled with merchandise of a bygone age.*

Members of the E.A.I.A. will probably recall in the January, 1953 issue of *The Chronicle* an announcement was made of the establishment by Mr. Harold Warp of a Pioneer Village in North Minden, Nebraska. Since that announcement was made the Warp Pioneer Village has been completed and officially opened to the public. The above pictures will give members some idea of the scope of this village and the articles contained. It is possible that this is a place that we will want to consider at some future time as a meeting place for the Association. We understand that this village is now becoming one of the major tourists attractions on highway No. 6 in Nebraska.

Mr. Warp's collection consists of more than 10,000 historical items, depicting the mechanical devices or modes of living for each era since 1830. The village is made up of 12 buildings on a two block area. The collection is growing so rapidly that a large addition is being added to the main building. Some of the structures themselves are historically

interesting, as for instance, the old church which was built in 1884 by the settlers of Kearney County with their own hands. The Lowell, Nebraska, Depot, once the terminus of the Burlington-Missouri River Railroad is also part of the village. While being moved to its present site, it was discovered that the depot had seven layers of worn out flooring. The Indian fort was moved in from Cowles, Nebraska. It was built in 1869, along with a stockade, to protect settlers from the Indians. These old landmarks together with other "period" buildings majestically authenticate the era in which they were used.

Another of the interesting exhibits is an old fashioned general store, a replica of the People's store which stood in Stamford. It has been painstakingly reproduced and its shelves are lined with articles which would have been there while the store was in its heyday. Mr. Warp plans to construct a sod house to show how the simple pioneers lived after having gone beyond the edge of civilization to found a home.

# The Chronicle

## The Chronicle

Early American

Industries Association, Inc.

The purpose of the association is to encourage the study and better understanding of early American industry, in the home, in the shop, on the farm, and on the sea, and especially to discover, identify, classify, preserve and exhibit obsolete tools, implements, utensils, instruments, vehicles, appliances and mechanical devices used by American craftsmen, farmers, housewives, mariners, professional men, and other workers.

**EDWARD DURELL, President**

500 Dublin Avenue, Columbus, Ohio

**LORING McMILLEN, Vice-President**

Staten Island Historical Society

Richmond, Staten Island, New York

**JAMES A. KEILLOR, Vice-President**

3 Ridgeway Ave., White Plains, N. Y.

**GEORGE M. SIMMONS, Vice-President**

Farmingdale, Long Island, New York

**MISS JANET R. MACFARLANE, Secretary**

Farmers' Museum

Cooperstown, New York

**MRS. FRANK D. PEIRCE, Treasurer**

51 Paxton Street, Leicester, Mass.

**M. W. THOMAS, JR., W. D. GEIGER**

*Editors of The Chronicle*

Williamsburg, Virginia

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Worcester, Mass

Communications regarding the contents of *The Chronicle* should be addressed to the Editor; regarding back numbers to Loring McMillen; suggestions for members to any of the Officers; all other matters to the President. Addresses as here given.

### DUES

The annual dues are payable January 1st, and are as follows. Active members \$5.00; Helpful members, \$7.50; Encouraging members, \$10.00; Enthusiastic members, \$15.00, and Delighted members, \$25.00. There is no distinction between classes, except the amount of dues, but *The Chronicle* cannot be financed unless a considerable number of the members pay more than \$5.00. Each member is expected to voluntarily place himself in the class which represents the amount he is willing to contribute to the support of the Association for the current year. Life membership costs \$50.00. *The Chronicle* is sent to all members without additional charge.

Printed on the Press of the *Virginia Gazette*, Founded 1736.

## SECRETARIES REPORT

By JANET MACFARLANE

The Early American Industries Association met at Plymouth, Massachusetts June 25-27, 1954. A great many people attended, including local Plymouth residents, with about 180 at the annual meeting dinner.

Registration was Friday morning, the 25th, at Pilgrim Hall with Mr. Warren P. Strong, Secretary of the Pilgrim Society, in charge. At 10:00 a. m. began the three-day program organized by and under the direction of Arthur G. Pyle, Executive Secretary of Plimoth Plantation. For early arrivals there was a tour of the Plymouth Cordage Company, the earliest rope-making concern in the country. Taken through in groups the members saw a modern rope-making plant which processes its rope with fast mechanical devices based on the same principle as early hand rope-making tools.

At noon a trip was taken on the Edaville Railroad in Carver, the oldest narrow gauge railroad in the United States. The train travels through cranberrybog country. After a picnic lunch, the guests were officially welcomed by Arthur G. Pyle, speaking for the host organization, the Plymouth Museum Council. This was followed by a tour of the Edaville Museum of the cranberry industry. Members returned to Plymouth for cocktails and a clambake at Dearn and McGrath's on the waterfront, which was followed by words of greeting from the President of the Chamber of Commerce and officials of the Plymouth Cordage Co. who presented motion pictures "The Plymouth Story" and "The Lifeline," both Cordage Co. films.

On Saturday, June 26, it was arranged for all members to visit Old Fort Harlow House, Antiquarian House, Plymouth Pottery, Plimoth Plantation, Pilgrim Hall, Howland House, the Old Burying Ground, Plymouth Rock and the Stockade. In the late afternoon the board of directors met at Mr. Pyle's home. At 6:30 the annual dinner meeting was held at Pinewood Lodge which included the annual business meeting of the Association, a "What's It" session and a bull session. At the members' meeting official word of regret was expressed for the passing of Mr. Charles E. Ayers and Mr. Frank K. Swain, both long-time members of the Association. Eighty new memberships were reported and announcement was made of the appointment of Robert G. Hill as the new membership chairman. Mr. Thomas, editor of *The Chronicle*, appealed for articles. As there were several invitations, the time and place of the fall meeting was left to the president. Treasurer's report showed a balance of \$2,277.92. New directors elected were Sterling Emerson, Daniel Niederlander, Frank Spinney and Erwin Zepp. The entire slate of officers were unanimously reelected.

On Sunday morning members enjoyed a Pilgrim Breakfast of fish cakes, corn bread and baked beans, served out of doors in the garden of Old Fort Harlow House. This was followed by tours to the Aptuxet Trading Post and to Duxbury.

## OCTOBER MEETING

Just as *The Chronicle* was going to press it was announced by Dr. Durell that our October meeting will be held in Cooperstown, New York. The dates will be Friday, Saturday, and Sunday — the 1st, 2nd, and 3rd of October. This news arrived too late for us to prepare our usual layout on a proposed museum visit, but since Cooperstown has been visited several times before by members of the E.A.I.A. we feel that possibly on this occasion the omission is not too serious.

The Farmers' Museum in Cooperstown offers to members of the E.A.I.A. some of the finest facilities in this country for the detailed study of tools of ancient crafts. In addition to the displays of tools, Cooperstown also has a series of superbly operated craft shops where craftsmen who are experts in their field practice their trades in the manner of by-gone days.

Facilities for lodging, dining and meeting are excellent, and there are also many other attractive things to see in the Cooperstown area. Full information on the Cooperstown meeting will be forwarded to all members as soon as it is prepared by the Program Committee.

## MORRIS WOODEN LEG

The New York Historical Society has informed the editors that they have been presented with the wooden leg of Gouverneur Morris (1752-1816) by Mrs. Frederick Menzies of London, England. The leg will be on display at the Society's Museum, 77th and Central Park West, New York City. Old readers of *The Chronicle* will recall that in Volume II, Number 15, September 1940 of *The Chronicle*, a very informative article on this leg appeared. This article was written by one of our most informed members, Dr. Sigmund Epstein, of New York City. Dr. Epstein has been a practicing surgeon for the past 51 years and has contributed over a score of articles to medical journals in addition to the articles for *The Chronicle* on blacksmiths, early American ambulances, and crutches as aides to locomotion.

## CORRECTION

It has been called to the attention of the Editors that the name of Mr. James A. Keillor, 3 Ridgeview Avenue, White Plains, New York, appears on the first published membership list of the E.A.I.A. in Volume I, Number 1 of *The Chronicle*. Mr. Keillor's name is incorrectly spelled in this first issue and the Editors wish to take note of this inaccuracy because of Mr. Keillor's long and valiant service to this organization.

## CHRONICLE INDEX

Mrs. Peirce reports that the Index for Volumes IV and V of the *Chronicle* is ready for sale. There are approximately 500 of these four page indexes available. The price of the index plus mailing charge is \$.25 and payment in stamps will be acceptable. All members who save their *Chronicles* will find the index a very valuable addition to their files. Write directly to Mrs. Peirce for the index.

## THIS AND THAT

By MARY EARLE GOULD

The oven at the side of the fireplace has very commonly and wrongly been called the "Dutch oven." It is a "bake oven" or a "brick oven." The Dutch oven is a low iron kettle on three feet, with a bale handle and a cover that has a narrow rim. This was used for baking bread. It was set in the embers and embers were heaped onto the cover, for which purpose the rim was made. This followed the first principle of cooking in a fire hole. Let's call the oven at the side the brick oven.

No pot or kettle ever hung directly on the crane. Pot hooks have a round end that was hung on the crane and a broad, flat end on which the pots and kettles were secured. Trammels have one end more closely bent which hung on the crane and a more open end on which the pots hung. There were saw-tooth trammels and chain trammels that hung on the lug pole high up in the chimney. These have a large hook for the pole and a flat hook for the pots.

A pot has bulging sides and a cover. A kettle has straight sides and no cover of its own. The teakettle is an exception. A large pot was called a cauldron.

Early utensils and implements used in the fireplace had long handles to enable the worker to be away from the heat; toasters, frying pans, wafer and waffle irons, coffee bean roasters, the toddy iron and others. Shorter handles, often tipped with wood, were of a later period.

Early toasters were handwrought, a revolving head on a base that has four short legs and an extending handle. Later toasters were made with head and base in one piece, with a handle attached with a hinge. These have decorations made of heavy iron wire, and they often have a wooden tip handle.

## FOOTNOTES

(Continued from Page 31)

1. John Randall (Circa 1700-1764)  
Schoolmaster and agriculturist; MA Christ College, Cambridge 1727, carried on a private school at York; published *The Semi-Virgilian Husbandry*.
2. Society for the Encouragement of Arts, Mechanics, and Commerce. 1753 to the present.
3. Cuthbert Clark (fl 1777)  
Writer on agriculture and mechanics, published the *True Theory and Practice of Husbandry* in 1777.
4. Gilbert Knowles (Circa 1674-1723)  
Botanist, known primarily for his *Materia Medica Botanica*, published in London 1723.
5. John Worlidge (Circa 1650-1698)  
Agricultural writer; Compiled *Systema Agriculturae*, 1669, the first systematic treatise on husbandry on a large and comprehensive scale.
6. Sembrador of Lucatello, From the Spanish, sembrade meaning an engine for plowing. Lucatello is a province in Spain. First reference is 1668.
7. Jethroe Tull (1674-1741)  
Agriculture writer, St. Johns College, Oxford, lawyer, farmed near Walingford where he invented his drill, 1701, introduced a system of pulverizing ground, published *Horse Hoe Husbandry*, 1733.
8. Richard Bradley (Circa 1680-1732)  
Botanist and horticulturist, professor of botany at Cambridge 1724, published *New Improvements of Planting and Gardening*, 1717, *Treatise of Fallowing*, 1724, and others.

## The Chronicle

## NEW MEMBERS

## CONNECTICUT

- New Haven:* Lewis Glaser, Box 123 (1932)  
*New Haven:* New Haven Historical Society, 114 Whitney Avenue. (1939)  
*Noroton:* Mr. & Mrs. R. W. Eddy, 20 Garden City Road. (1949)  
*Greenwich:* George W. Rhine, Greenwich Towers. (1903)  
*Trumbull:* H. M. Sturges. (1913)

## DELAWARE

- Newark:* University of Delaware Library. (1943)  
*Lewes:* Miss Catherine C. Maull, 108 Shipcarpenter Street. (1897)

## ILLINOIS

- Chicago 14:* Wheeler Sammons, 536 Deming Place. (1930)  
*Chicago:* Henry S. Cogar, 1305 Ritchie Court. (1912)

## INDIANA

- Madison:* John T. Windle, Shrewsbury House. (1956)

## MAINE

- Albion:* Julian Straus. (1922)  
*Portland 4:* Dr. & Mrs. William Monkhouse, 29 Bowdoin Street. (1902)

## MASSACHUSETTS

- Boston:* Robert C. Vose, Jr., 559 Boylston Street. (1950)  
*South Braintree:* Lewis W. Pollard, 1769 Washington St. (1961)  
*Sturbridge:* Herbert C. Darbee, Old Sturbridge Village (1937)  
*Sturbridge:* Gladwin K. Lusk, Old Sturbridge Village. (1946)  
*Andover:* J. A. Vandenbergh, 7 Argilla Road. (1910)  
*Deerfield:* J. R. Dolan, R.F.D. No. 1. (1895)  
*East Dennis:* Robert C. Eldred. (1916)  
*Groton:* G. E. Jordan, Jr., Box 511. (1898)  
*Longmeadow:* Gerald G. Fox, 66 Colony Road. (1905)  
*Salem:* Edward Rushford, 170 Derby St. (1896)  
*Salem:* Philip von Saltza, 8 Carpenter St. (1899)  
*Sunderland:* Mr. & Mrs. William L. Hubbard. (1919)  
*West Newbury:* Walter T. Grout, 502 Main Street. (1904)  
*Harwich Port:* Miss Marion A. Burnham, 288 Lower County Road.

## MICHIGAN

- Detroit:* Miss Margot Pearsall, Detroit Historical Museum, 5401 Woodward Avenue. (1934)

## NEW JERSEY

- Elizabeth:* Sidney M. Edelstein, 11 Salem Park. (1947)  
*Tenafly:* James A. Day, 39 Oak Street. (1962)  
*Trenton:* Library, Archives & History, State of New Jersey. (1955)  
*Allendale:* Mrs. Frank Beaven, Forest Road. (1911)  
*Caldwell:* Mr. & Mrs. Edward J. Muller, 45 Cedar St. (1924)

## NEVADA

- Carson City:* Roy V. Boswell, Box 275. (1908)

## NEW HAMPSHIRE

- Dover:* Thomas C. Dunnington, 230 Washington St. (1906)  
*Hillsboro:* Sherwin C. Metzger. (1900)

## NEW YORK

- Brooklyn 34:* Arnold I. Zlotoff, 5704 Farragut Road. (1920)  
*Hampton Bays, L. I.:* Mr. & Mrs. Robert P. Schur, W. Tiana Road. (1907)  
*Hartsdale:* Paul A. Weld, 104 Pinewoods Gardens. (1921)  
*Pleasant Valley:* Miss Sara Hubner, Gretna Road. (1909)  
*Pleasant Valley:* Mr. William H. Hubner, Gretna Road. (1908)  
*Rye:* Dr. Robert Mallory, III, 169 Milton Road. (1915)  
*Yonkers:* Otto L. Laxy, 27 Radford Street. (1914)  
*New York City:* Jack Gordon, 203 West 81st St., Apt. 1-B (1942)  
*Ernest LoNano,* 235 East 42nd Street. (1960)  
*Clement J. Wyle,* 221 West 57th Street. (1929)  
*Ossining:* W. R. Flournoy, 33 Justamere Road. (1959)  
*Scarsdale:* Norman S. Swan, Chateau Lafayette. (1945)  
*Sherman:* Miss Genevieve E. Matteson. (1931)  
*Williamsville:* Williamsville Water Mills, 56 Spring St. (1940)  
*Brooklyn:* Miss Edna Huntington, 490 2nd Street. (1936)  
*Bullville:* Herb Glass. (1954)  
*Cooperstown:* D. A. Otto, Johnny Cake Farm. (1926)

- Esperance:* Fred Lyons. (1957)  
*Larchmont:* Marion Field, 62 Palmer Avenue. (1927)  
*Little Falls:* Gordon D. Little, Box 573. (1959)  
*Lyons:* Miss Anne D. Hotchkiss. (1941)  
*New Lebanon:* Jerome Count, Shaker Road. (1933)

## OHIO

- Columbus:* John S. Still, Curator of Historical Collections, Ohio State Museum. (1953)

## PENNSYLVANIA

- New Hope:* Alfred Arnold. (1917)  
*New Hope:* William C. Halpine. (1918)  
*Pottstown:* H. M. Kephart, 395 N. Evans Street.  
*Philadelphia:* Historical Society of Pennsylvania, 120 Locust Street. (1938)  
*Secane:* Mr. & Mrs. Maurice E. Phillips, How Mar Apts. (1951-2)

- Shippensburg:* Henry E. Luhrs, Box B. (1928)

## VERMONT

- Waterbury:* Milton E. Sunderland. (1901)

## RHODE ISLAND

- Pawtucket:* Daniel Tower, Old Slater Mill, P. O. Box 727 (1930)

## CHANGE OF ADDRESS

- Frank H. Wildung, to P. O. Box 426, Shelburne, Vermont (now with the Shelburne Museum)  
 Capt. E. Hale Coddington, to "Woodside" Towanda, Pennsylvania  
 Richard K. Doan, to R.D. No. 1, Newtown, Connecticut.  
 Hardinge Scholle, to 3336 Dent Place, Washington 7, D. C.  
 Dr. Arthur L. Waters, to Bethel, Maine

## DR. LUDLOW BULL

The Editors have been notified of the death of Dr. Ludlow Bull, of Litchfield, Connecticut. Dr. Bull was one of the most distinguished members of the Early American Industries Association, and had been a member of the Association since April of 1934.

Dr. Bull at his death was an Associate Curator of the Metropolitan Museum and a distinguished Egyptologist having been a member of field expeditions to Egypt, Mesopotamia and Syria. He was Curator of Yale University's Egyptian Collection since 1924.

Dr. Bull is survived by his wife, Mrs. Katherine Exton Bull, two sons, Frederick K. Bull, II, and Rodger L. Bull, and a daughter, Mrs. Agnes Bull Sherman.

## CHARLES E. AYERS

It was with deep regret that the Editors of *The Chronicle* learned of the death of Mr. Charles E. Ayers of Worcester, Massachusetts, one of the oldest and most valued members of the Early American Industries Association. Mr. Ayers became a member of the E.A.I.A. in May, 1934, and served for a number of years on the Board of Directors and at his death was a valued member of the Editorial Advisory Board. In 1951 he directed an E.A.I.A. exhibit at the Boston Antique Show.

In addition to his membership in the E.A.I.A., Mr. Ayers was a founder of the *Rush Light Club*, an organizer of the *Glass Club of America*, and active in the *Worcester Historical Society*. Mr. Ayers had a collection of over 1000 lighting devices in his own Museum in Fitzwilliam, New Hampshire until they were recently purchased.



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